



14759

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: ) Group Art Unit: Unassigned  
CRAIG S. BESHORE ) Examiner: Unassigned  
SERIAL NO.: 10/804,351 )  
FILED: March 17, 2004 )  
FOR: **APPARATUS WITH PISTON HAVING** ) Filed: May 5, 2004  
**UPPER PISTON EXTENSIONS** )

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**PETITION TO MAKE SPECIAL BECAUSE OF ENVIRONMENTAL QUALITY**  
**(37 C.F.R. 1.102(c) and M.P.E.P. § 708.02(v))**

Special Program Law Office  
Office of Petitions  
Commissioner of Patents & Trademarks  
Washington, D.C. 20231

Dear Sir:

Applicant hereby petitions to make this application special because it is for an invention that materially enhances the environment of mankind, by contributing to the restoration or maintenance of the basic life-sustaining material elements (air, water and/or soil).

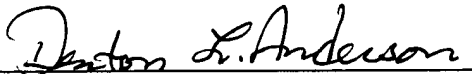
The accompanying declaration by the applicant explains how this invention contributes to the restoration or maintenance of one of these life-sustaining elements.

There is believed to be no fee associated with the filing of this document. However, if this belief is in error, please charge any such fee to Deposit Account No. 19-2090.

Respectfully submitted,

SHELDON & MAK

Dated: May 5, 2004

By:   
Denton L. Anderson  
Reg. No. 30,153

225 South Lake Avenue, 9th Flr.  
Pasadena, California 91101  
(626) 796-4000

I hereby certify that on May 5, 2004, I deposited with the U.S. Postal Service this package, addressed to the Special Program Law Office Office of Petitions, ASSISTANT COMMISSIONER FOR PATENTS, Washington, D.C. 20231.

  
Jennifer Anka  
Legal Assistant for DENTON L. ANDERSON, ESQ.



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**DECLARATION OF CRAIG BESHORE**

Special Program Law Office  
Office of Petitions  
Commissioner of Patents & Trademarks  
Washington, D.C. 20231

Dear Sir:

I am the inventor in the above-referenced patent application.

The subject application provides an apparatus useful in a two-stroke cycle engine. When used in a two-stroke cycle engine, the apparatus provides the engine with significantly reduced emissions characteristics for the following reasons:

1. Engines of the prior art have a well-known problem where a portion of the fresh intake charge "short circuits" and escapes out the exhaust during the scavenging process. Unburned fuel in the exhaust greatly raises pollutants. This short circuiting is the result of piston-controlled intake (scavenge) cylinder ports being located at about the same level as the cylinder exhaust ports. Being adjacent and across the cylinder

from one another makes it easy for the in-rushing gases to follow out-rushing gases out the cylinder. The present application design moves the intake ports to the upper (top) end of the cylinder, while the exhaust remains at the lower end (bottom) of the cylinder. This configuration enables filling the cylinder length prior to fresh intake charge reaching the exhaust port. The upward movement of the piston is adapted to timely close the exhaust port before the mixture escapes.

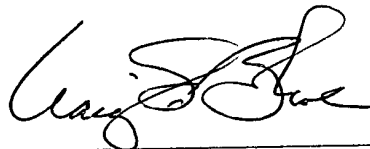
2. Engines of the prior art also have a well-known problem involving the difficulty of bringing intake fuel-air mixture from the bottom of the cylinder to the top of the cylinder where the igniter is located. During part throttle operation, most of what remains in the cylinder are burnt gases. Moving the small amount of fresh intake mixture, undiluted by burnt gases, to the igniter becomes very problematic. Misfires are typical, resulting in greatly increased pollutants. In the present application design, this problem is solved by a scavenge chamber of higher-pressure capability delivering intake mixture directly to the top of the combustion chamber. Shaping and directing the delivery passages ensure combustible mixture at the igniter even at very small throttle openings, thus eliminating misfires and reducing pollutants.

3. Engines of the prior art also have a well-known problem of lubricating oil passing to the exhaust port. Lubricating oil in the exhaust greatly increases pollutants. In the invention, this problem is solved by a quadrant system of rings and seals and locating the exhaust port on the non-thrust quadrant. The long seals in the cylinder isolate the quadrants and the rings limit the oil to the non-thrust quadrants. This is not detrimental to engine operation, as the piston load on these quadrants is minimal.

4. A current technology that has proven to reduce pollutants by consuming less fuel is the electric hybrid. Adaptation of this technology is hampered by its high cost. Replacing the currently used four-cycle engine in an electric hybrid with a two-cycle engine would not only mean that the main power source would use less fuel, but needing half as many cylinders, the engine would be substantially less expensive to build and maintain. Another enabling factor would be the smaller size of the engine, allowing more room for batteries and the electric motor/generator

I declare under penalty of perjury that the foregoing is true and correct, and that if called to testify thereto, I could and would so testify. All of the statements made in this Declaration are personally known to me to be true, and any statements made on information and belief are believed to be true. I further declare that I understand that willful false statements and the like are punishable by fine or imprisonment or both (18 U.S.C. § 1001) and may jeopardize the validity of the application or any patent issuing thereon.

Executed this 28<sup>th</sup> day of April, 2004, at Pasadena, California.



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CRAIG BESHORE